Order Heteromi

Body elongate. Jaw bones complete, little aberrant. Vomer obsolete. Palatines and pterygoides well developed. Cranium with condyle confined to basioceipital. Exoccipital coalesced with epiotics and opisthotics. Opercular apparatus complete. Preopercle slightly connected with suspensorium. Suborbitals suppressed. Scapular arch formed by proscapula and posttemporal, latter detached from side of cranium and impinging on supraoccipital. Hypercoracoid and hypocoracoid coalescing in single lamellar imperforate plate. Actinosts normal. Anterior vertebrae separate. Air vessel with duct. Scales small. Ventrals abdominal.

Analysis of families

a^1. Jaws normal; both jaws with teeth; dorsal spines separated, extend more or less length of back. Notacanthidae.

a^2. Jaws form suctorial mouth; no teeth; dorsal spines graduated, close together and form high angular fin little premedian. Lipogenyidae.

Family NOTACANTHIDAE

Body somewhat compressed, ends in tapering band like tail. Snout projecting. Mouth inferior. Both jaws with teeth, lower meets palate. Teeth close set in jaws and on palatines. Palatines movable. Sharp spine, mostly hidden by fleshy folds of lips at mouth angle. Gill openings wide, not restricted above, membranes separate, free from isthmus. Gills 4. Gill rakers long, slender. Pseudobranchiae absent. Ovaries without oviducts. Shoulder girdle loosely suspended to skull by ligament. Scales cycloid. Dorsal represented by series of short separated spines, jew or no soft rays. Anal rays numerous, front ones spinous.

Analysis of genera

a[1]. Notacanthinae. Dorsal spines 6 to 12; upper teeth compressed and obliquely triangular; ventrals confluent. Notacanthus.

a[2]. Polyacanthonotinae. Dorsal spines 27 to 38; teeth in jaws fine, erect; ventrals separate.

b[1]. Snout proboscis like; lateral line strongly arched; dorsal and anal spines long, flexible, latter not over 30. Polyacanthonotus.

b[2]. Snout not very elongate; lateral line straight; dorsal and anal spines low, strong, latter 50 or more. Macdonaldia.

Genus Polyacanthonotus Bleeker

Polyacanthonotus BLEEKER, Versl. Kon. Meded. Akad. Wet. Amsterdam, ser. 2, vol. 8, 1874, p. 368. Type Notacanthus rissoanus FILIPPI and VERANY, orthotypic.

Zanotacanthus GILL, Johnson's Univ. Cyclopaedia, vol. 3, 1876, p. 883. Type Notacanthus rissoanus FILIPPI and VERANY, monotypic.

Paradoxichthys GIGLIOLI, Nature, vol. 25, 1882, p. 535. Type Notacanthus rissoanus FILIPPI and VERANY, monotypic.

Teratichthys (not KÖNIG 1825) GIGLIOLI, Nature, vol. 25, 1882, p. 535. Type Notacanthus rissoanus FILIPPI and VERANY.

Teratichthys GIGLIOLI proposed to replace Paradoxichthys GIGLIOLI.

Body very slender, elongate. Snout prolonged into proboscis like tip at least third of head. Teeth in jaws erect, fine, in rows in each jaw, stronger on palate, arranged in form of horseshoe. Lateral line conspicuous, decending from angle of opercle in broad strong curve to below middle region of body at point not far from vent. Dorsal represented by numerous, slender, curved, flexible, disjoined spines, 29 to 37. Anal of small, longer, slender, flexible spines, passing somewhat behind last of dorsal spines into low short rayed fin. Pectoral moderate, slender, above median axis close below pectoral. Ventral slender, fins entirely separate, reach vent, with 1 spine.

Analysis of species

a[1]. Gnathonotacanthus new subgenus. Pectoral reaches 3 1/2 to 4 times to ventral; maxillary reaches eye.

b[1]. Pectoral 3 1/2 to ventral. challengeri.

b[2]. Pectoral small, reaches 4 to ventral. vaillanti.

a[2]. Polyacanthonotus. Pectoral reaches 1/2 to ventral; maxillary reaches 3/4 to eye. rissoanus.

Gnathonotacanthus new subgenus. Type Polyacanthonotus vaillanti new species. Maxillary reaches eye. Pectoral reaches 3 1/2 to 4 times to ventral.

(γνάθος jaw; Notacanthus.)

Polyacanthonotus challengeri (Vaillant)

Notacanthus challengeri VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p. 388 (on GÜNTHER).

-- GOODE and BEAN, Oceanic Ichth., 1895, p. 172 (reference).

Macdonaldia challengeri JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 617 (compiled).

Notacanthus rissoanus (not FILIPPI and VERANY) GUNTHER, Rep. Voy. Challenger, vol. 22, 1887, p. 250, pl. 61, fig. B. South of Yeddo, 1875 fathoms.

Depth 12 7/8, 4 1/3 to vent; head 9 to caudal base, 3 to vent, width 3 1/10. Snout 3 1/3 in head; eye 7 1/4, 2 2/5 in snout, slightly greater than interorbital; maxillary reaches nearly to eye, length 3 1/5 in head; each jaw with series of fine, minute, uniform teeth and similar row on palatines; interorbital 7 1/4, little convex. Gill rakers 6 + 16, lanceolate, rather flexible points, 1 3/5 in gill filaments, which 1 2/3 in eye.

Scales very minute, smooth, imbricate, adherent. Lateral line distinct, axial, complete.

D. XXXIV, first spine inserted little before pectoral origin; A.L?, 120?; caudal small, slender, pointed, long as eye; pectoral 2 1/2 in head; ventral 2 2/5.

Uniform dull brown. Iris gray brown.

Pacific Ocean. For comparison with Günther's account and figure the following details are given:

Depth 11 4/5, 5 to vent; head 7 1/2 to caudal base, 3 1/5 to vent, width 2 2/3. Snout 3 1/5 in head; eye 6 1/5, 1 7/8 in snout, 1 3/5? in interorbital; maxillary reaches 1/8 in eye, length from snout tip 3 in head; each jaw with series of fixed minute teeth and similar palatine series; interorbital low.

D. XXXIV; A. L.N, 79; caudal 3 1/4 in head, slender, pointed; pectoral 2 1/2, rays 11; ventral 2 2/3 in head; rays I, 9, fins separated.

Uniform light brown. Blackish about gills and on soft anal. Length 396 mm.

Polyacanthonotus vaillanti new species

Notacanthus rissoanus (not FILIPPI and VERANY) VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p. 335, pl. 27, fig. 1 (part).

Depth 9 1/3, 3 1/2 to vent; head 8 1/3 to caudal base, 3 to vent, width 3 1/6. Snout 3 1/4 in head; eye 5, 1 1/2 in snout, greatly exceeds interorbital; maxillary reaches eye, length 3 in head; single row of very small uniform teeth in jaws and on palatines, series of each continuous; bony interorbital 10 1/2, low, depressed. Gill rakers 4 + 16?, lanceolate, short, 2/3 of gill filaments, which 1 2/3 in eye.

Scales minute, adherent, but little imbricated. Lateral line axial, extends to last fourth of tail.

D. XXXVII, first spine inserted over middle of depressed pectoral; A. LVI, 120?; caudal 8? in head; pectoral 2 2/5; ventral 2 1/2, separated.

Uniform brown, Iris neutral gray. Inside mouth and gill opening blackish. Fins pale brown.

Diagnosis. The specimen here recorded is surely identifiable with the figure of Notacanthus rissoanus Vaillant. The pectoral is similarly small, extending less than 1/3 to ventral, the maxillary reaches eye and the dorsal spines are in agreement. These characters seem to separate it from N. rissoanus, with which it is united by Goode and Bean.

Type No. 44248 U. S. N. M.

44248 U. S. N. M.

Albatross Station 2103. Length 500 mm.

Subgenus Polyacanthonotus Bleeker

Maxillary reaches 3/4 to eye. Pectoral reaches 3 1/2 to 4 times to ventral.

Polyacanthonotus rissoanus (Filippi and Verany)

Notacanthus rissoanus FILIPPI and VERANY, Mem. Accad. Sci. Torino, vol. 18, 1859, p. 190. Nice. -- GUNTHER, Cat. Fishes Brit. Mus., vol. 3, 1861, p. 545 (copied). -- CANESTRINI, Fauna Italia, Pesce, 1874, p. 118 (Nice). -- MOREAU, Hist. Nat. Poiss. France, vol. 3, 1881, p. 162. -- GIGLIOLI, Elenco Fauna Ital., Pesc., 188, p. 34; Nature, vol. 25, 1882, p. 535. -- VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p. (316), 335, (part; not pl. 27, fig. 1 or material). -- MOREAU, Manuel Ichth. France, 1892, p. 379 (Mediterranean).

Polyacanthonotus rissoanus GOODE and BEAN, Oceanic Ichth., 1895, p. 170, (not pl. 51, fig. 188) pl. 52, figs. 194a (head below) b (ventrals) (copied), text fig. (compiled).

Depth 12 2/5, 4 to vent; head 8 1/6 to caudal base, 2 3/5 to vent, width 3 1/8. Snout 2 7/8 in head; eye 6 1/2, 2 1/3 in snout, subequal with interorbital; maxillary reaches 3/4 to eye, with moderately small spine; teeth fine, slender, small, uniform, uniserial in jaws and palatines, continuous in both; interorbital 5 7/8, convex. Gill rakers 4 + 15?, lanceolate, slender, subequal with gill filaments or 2 in eye.

Scales very fine, mostly fallen. Lateral line axial, extends nearly to last third of tail.

D. XXXL, last spine double, first over hind edge of gill opening; A. XXXVI, 135?; caudal equals eye; pectoral 1 4/5 in head, reaches half way to ventral; ventral 2 in head, fins confluent.

Pale brown, nearly uniform. Opercles neutral gray and edge of gill opening blackish. Inside mouth and gill opening black. Iris neutral gray. Fins all pale brown.

Atlantic Ocean, Mediterranean. According to the sketch of Risso's type, published by Goode and Bean, my example is very close. The sketch shows a similar pectoral reaching half way to the ventral, though the first dorsal spine is indicated midway between the gill opening and pectoral origin and the maxillary apparently not quite reaching eye. In its fin formulae and confluent ventrals other points of agreement are noticed.

43854 U. S. N. M. N. 35° 49' 30" W. 74° 34' 45".

Albatross Station. Length 328 mm.

Genus Macdonaldia Goode and Bean

Macdonaldia GOODE and BEAN, Oceanic Ichth., 1895, p. 171. Type Notacanthus rostratus COLLETT, designated by JORDAN, Genera of Fishes, pt. 4, 1920, p. 465.

Body elongate. Snout moderate. Teeth in jaws erect, fine, also series on vomer and palate. Body and head covered with minute imbricated scales. Line of pores on inner mandibular edge. Lateral line straight, conspicuous. Dorsal of numerous, short, straight, robust, disjoined spines, 27 to 36, first before pectoral origin. Anal with longer portion of few short, slightly curved, disjoined spines, 35 to 55, passing to flexible rays below last dorsal spines. Pectoral moderate, placed far back, below middle line of body, remote from lateral line. Ventral moderate, fins entirely separate.

Analysis of species

a^1. Dorsal spines 28 to 33; pectoral 2 to 2 3/5 in head.

b^1. Anal spines over 50.

c^1. Depth 9 1/5, to vent 3 2/5; anal spines 52. alta.

c^2. Depth 13, to vent 4 2/5; anal spines 55. longa.

b^2. Anal Spines 41 to 43; depth 10 4/5 to 12 2/3, to vent 3 2/5 to 3 3/4. rostrata.

a^2. Dorsal spines 36; pectoral 3 2/5 in head. africana.

Macdonaldia alta Gill and Townsend

Macdonaldia **alta** GILL and TOWNSEND, Proc. Biol. Soc. Washington, vol. 11, Sept. 17, 1897, p. 282. -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 3, 1898, p. 2826 (copied).

Depth 9 1/5, 3 2/5 to vent; head 7 7/8 to caudal base, 3 to vent, width 3 1/5. Snout 3 1/3 in head; eye 7 1/2, 2 1/8 in snout, greater than interorbital; maxillary reaches eye, spine moderate, length 3 1/3 in head; teeth uniserial, small, uniform in jaws and on palatines, series continuous; interorbital 8 3/4, convex. Gill rakers 4 + 13, lanceolate, rather short, subequal with gill filaments or 2 in eye.

Scales small, adherent, cycloid. Lateral line axial, extends to last third of tail.

D. XXXII, first spine inserted close behind pectoral origil; A. L II, 125; caudal very short, 1/2 of eye; pectoral 2 1/3 in head; ventral 2 3/4, fins separated.

Uniform dark brown, Iris neutral gray. Inside gill opening and mouth blackish brown. Fins all brown.

Bering Sea.

48774 U. S. N. M. N. 54° 54' W. 168° 59'. In 1401 fathoms. Albatross Station 3604. August 13, 1895. Length 465 mm.

Macdonaldia longa Gill and Townsend

Macdonaldia longa GILL and TOWNSEND, Proc. Biol. Soc. Washington, vol. 11, Sept. 17, 1897, p. 282. -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 3, 1898, p. 2826 (copied).

Depth 13, 4 2/5 to vent; head 8 1/5 to caudal base, 2 1/5 to vent, width 3 1/2. Snout 3 3/5 in head; eye 6 2/3, 1 7/8 in snout, greater than interorbital; maxillary reaches eye, with moderate spine, length 3 1/10 in head; teeth fine, uniform, slender, pointed, uniserial in jaws and on vomer; interorbital 10, low, little convex. Gill rakers 4 - 14, lanceolate, short, pointed, rather flexible, 1 3/4 in gill filaments, which 1 4/5 in eye.

Scales very small, adherent, cycloid. Lateral line axial, extends to last third in tail.

D. XXXIII, first spine over last third in space between gill opening and pectoral origin; A. L V, 111; caudal 1 1/2 in eye; pectoral 2 3/5 in head; ventral 2 3/5.

Uniform dark brown. Iris neutral gray. Inside mouth and gill opening blackish brown. Fins dull brown.

Bering Sea.

48775 U. S. N. M. N. 54° W. 168° . In 900 fathoms. Albatross Station 3607. Length 535 mm.

Macdonaldia rostrata (Collett)

Notacanthus rostratus COLLETT, Bull. Soc. Zool. France, vol. 14, 1889, p. 307. N. 46° 4' 40" W. 49° 2' 30", 1267 meters, off Newfoundland; Res. Camp. Sci. Monaco, vol. 10, 1896, p. 48, pl. 5, fig. 21 (type).

Macdonaldia rostrata GOODE and BEAN, Proc. U. S. Nat. Mus., vol. 17, 1894, p. 467, pl. 18, fig. 2 (N. 39° W. 70°, 55 to 693 fathoms); Oceanic Ichth., 1895, p. 171, pl. 51, fig. 189, pl. 52, figs. a (head below) b (ventrals) (N. 39° 47' W. 70° 30' 30", 963 fathoms; N. 39° 48' W. 70° 36', 551 fathoms). -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 617 (compiled). -- ROULE, Res. Sci. Camp. Monaco, vol. 52, 1919, p. 29 (N. 39° 21' 20" W. 31° 5' 45", 1360 meters). -- BARNARD, Ann. South African Mus., vol. 21, pt. 1, June 1925, p. 172, pl. 8, fig. 5 (off Cape Point, 900 to 100 fathoms).

Depth 10 4/5 to 12 2/3, 3 2/5 to 3 3/4 to vent; head 8 4/5 to 9 4/5 to caudal base, 2 4/5 to 2 7/8 to anal, width 3 1/4 to 3 1/3. Snout 2 3/4 to 2 7/8 in head; eye 5 to 6 2/3, 2 to 2 1/3 in snout, greater than interorbital; maxillary reaches 2/3 to eye, length from snout tip 2 3/4 to 3 2/3 in head; each jaw with series of minute teeth, simular row on palatines; interorbital 7 1/4 to 8 1/2, convex. Gill rakers 6 - 10?, lanceolate, rather short and flexible, 1 3/4 in gill filaments, which 1 1/3 in eye.

Scales minute, imbricate, adherent. Lateral line continuous until midway in tail, axial.

D. XXVIII to XXXI, first spine inserted over hind edge of gill opening; A XLI to XLIII, 150?; caudal 5 to 6 in head; pectoral 2, ventral 2 1/6 to 2 1/5.

Uniform brown. Iris gray. Inside mouth and gill opening black.

Atlantic Ocean.

35601 U. S. N. M. N. 39° 47' W. 70° 30' 30". In 963 fathoms. Albatross Station 2216. Length 407 mm.

35602 U. S. N. M. Albatross Station. Length 430 mm.

39246 U. S. N. M. N. 37° W. 73°. Albatross Station. Length 433 mm.

1 example U. S. N. M. N. 39° 48' W. 70° 36'. In 551 fathoms. Albatross Station 2553. Length 433 mm.

Macdonaldia africana Gilchrist and Von Bonde

Macdonaldia africana GILCHRIST and VON BONDE, Fisher. Marine Biolog. Survey South Africa, Rep. No.3, 1922 (1924), No. 7, p. 11, pl. 3, fig. 1. Off Table Bay, 1220 fathoms. -- BARNARD, Ann. South African Mus., vol. 21, pt. 1, June 1925, p. 173 (type).

Depth 10, 4 to vent; head 7 to caudal base, 2 3/4 to vent. Snout 3 in head; eye 7 1/2, 2 1/2 in snout; maxillary reaches 1/5 in eye, length from snout tip 2 9/10 in head; each jaw with series of minute teeth and similar ones on vomer or palatines.

Scales minute, imbricate. Line of mucous pores on inner edge of mouth.

D. XXXVI; A. XL VII; pectoral 3 2/5 in head, rays 12; ventral 3 2/5, rays I, 9, not confluent.

Brown. Length 395 mm. (Gilchrist and Von Bonde, Barnard.)

South Africa.

Genus Notacanthus Bloch

Notacanthus BLOCH, Abhandl. Böhm. Gesell. Wiss., 1787 (1788), p. 278. Type Notacanthus chemnitzi BLOCH, monotypic.

Acanthonotus BLOCH, Naturg. Aus. Fische, vol. 9, 1795, p. 113. Type Notacanthus nasus BLOCH-Notacanthus chemnitzi BLOCH. Acanthonotus BLOCH proposed to replace Notacanthus BLOCH; precludes Acanthonotus GRAY 1831 and (TICKELL) DAY 1888; versus Acanthinotus SWAINSON in birds.

Campylodon FABRICIUS, Vidensk. Silsk. Skrift. Kjöbenhavn, vol. 4, 1793, p. 22. Atypic. Type Campylodon fabricii REINHARDT, Vidensk. Selsk. naturvid. og mathem. Afhandl., vol. 7, 1838, p. 120.

Campilodon CUVIER, Regne Animal, ed. 2, vol. 2, 1829, p. 205. Type Notocanthus nasus BLOCH, monotypic.

Gigliolia GOODE and BEAN, Oceanic Ichth., 1895, p. 169. Type Gigliolia moseleyi GOODE and BEAN, monotypic.

Body much compressed, elongate. Head much compressed. Snout obtuse, tip rounded, not proboscis like. Mouth cleft inferior. Teeth acicular, uniserial on maxillaries, biserial on dentaries, villiform and biserial on palatines. Gills 4. Branchiostegals 8. Scales very numerous, moderate, round, thin, flexible. Dorsal almost rudimentary, of 12 to 15 very short flexible spines, remote from each other and not connected by membrane. Anal very long, origin close behind vent, which nearly midway in body. Front part of anal of separate, flexible spines, without membranes, resembling those of dorsal; these gradually lengthen, grading into articulated branched rays. No caudal. Ventrals broad, with wide peduncle-like bases, closely contiguous, separated only by slight basal groove, situated near vent.

Analysis of species

a^1. Notacanthus. Dorsal begins little before anal origin; lip normal, continuous.

b^1. Pectoral reaches 4/5 to 7/8 to ventral.

c^1. Dorsal spines 9; anal 17. spinosus.

c^2. Dorsal spines 12 to 15; anal 19 to 28. abbotti.

b^2. Pectoral reaches 2 to 2 1/4 to ventral.

d^1. Dorsal spines 11; anal 18 to 21; maxillary reaches 1/4 to 2/5 in eye. analis.

d^2. Dorsal spines 7; anal 11; maxillary reaches 1/2 in eye. bonaparte.

d^3. Dorsal spines 7 to 9; anal 13 or 14; maxillary reaches 2/5 in eye. sexspinis.

b^3. Pectoral reaches 3 1/4 to 3 2/3 to ventral.

e^1. Dorsal spines 10; anal 19; scales transversely 56. phasganorus.

e^2. Dorsal spines 11; anal 15; scales 40 transversely. chemnitzi.

a^2. Gigliolia. Dorsal origin opposite anal origin; lips absent medially; pectoral reaches half way to anal; dorsal spines 8 or 9; anal 15 to 18. moseleyi.

Notacanthus spinosus Garman

Notacanthus spinosus GARMAN, Mem. Mus. Comp. Zool., vol. 24, 1899, p. 301, pl. L, figs. 4, a-b. N. 7° 31'30" W. 79°14', 458 fathoms; N. 7°9'45" W. 80°50', 322 fathoms, Gulf of Panama.

Depth 8 1/6, 3 to vent; head 5 to caudal base, 1 7/8 to vent, width 3. Snout 4 2/5 in head; eye 6 1/8, 1 1/5 in snout, exceeds interorbital; maxillary reaches 1/5 in eye, with moderately small spine, length 3 1/3 in head; teeth fine, uniserial, uniform slender, pointed, in jaws and on palatines; interorbital 6 1/2, little convex. Gill rakers 3 - 9, short points, 1/2 of gill filaments, which 1 1/2 in eye.

Scales minute, adherent. Lateral line axial, extends nearly to last 2/5 of tail.

D. IX, first spine inserted little behind ventral origin, last spine 5 in head; A. XVII, 108?, caudal 7 in head; pectoral 1 3/5, reaches 7/8 to ventral; ventral 2 3/5, fins confluent.

Brown. Iris gray. Opercle gray brown. Inside mouth and gill opening blackish brown. Fins pale brown.

Gulf of Panama.

57891 U. S. N. M. In 458 fathoms. Albatross Station 3384. Length 167 mm.

Notacanthus abbotti new species

Depth 8 2/5 to 9, 3 to 3 1/3 to vent; head 4 4/5 to 5 4/5 to caudal base, 2 to vent, width 3 to 3 2/3. Snout to eye 4 to 6 1/3 in head; orbit 4 2/3 to 5 1/2; eye 6 2/5 to 6 1/2, 1 2/3 to 1 7/8 in snout, slightly greater than interorbital in young to 1 3/5 in interorbital with age; maxillary reaches 1/2 in eye or to hind eye edge with age, with small concealed spine, length 2 1/3 to 2 2/5 in head; teeth minute, slender, uniserial, uniform, in jaws and on palatines; interorbital 4 2/5 to 5, broadly and slightly convex. Gill rakers 4 + 11, short points, equal gill filaments or 1/2 of eye.

Scales very small, adherent. Lateral line axial, extends 2/3 in tail.

D. XII to XV, first spine inserted little behind ventral base, last spine 5 1/5 to 6 in head; A. XIX to XXVIII, 56? to 98?, caudal 2 1/2 to 4 in head; pectoral 1 4/5 to 1 7/8, fin reaching 4/5 to 7/8 to ventral; ventral 2 1/5 to 3, fins confluent.

Brown. Iris neutral gray. Inside mouth and gill opening black. Edge of gill opening narrowly blackish. Jaws dark brown. Fins brownish.

Diagnosis. Related to Notacanthus bonapartii in the large eye and having dorsal origin behind ventral origin. It has more dorsal and anal spines and longer pectorals, nearly reaching ventrals.

Type No. U. S. N. M.

Named for Dr. W. L. Abbott, who made many important collections of natural history materials, including fishes, for the U. S. National Museum.

2368. D. 5508. Camp Overton Light, Iligan Bay, S. 6° E., 4.9 miles (N. 8°17'24" E. 124°11'42"), northern Mindanao and vicinity. In 270 fathoms. August 5, 1908. Length 200 mm.

2386. D. 5510. Camp Overton Light, S. 68° W., 9.1 miles (N. 8°16' W. 124°3'), northern Mindanao and vicinity. In 423 fathoms. August 7, 1909. Length 260 mm. Type.

10101. D. 5293. Escarceo Light N. 59° W., 6 miles (N. 13°28'15" E. 121°4'30"), China Sea vicinity southern Luzon. In 180 fathoms. July 23, 1908. Length 157 mm.

3747. D. 5504. Macabalan Point Light (Mindanao), S. 39° E., 6 miles (N. 8°35'30" E. 124°36'), northern Mindanao and vicinity. In 200 fathoms. August 5, 1909. Length 221 fathoms.

Notacanthus analis Gill

Notacanthus analis GILL, Proc. U. S. Nat. Mus., vol. 6, 1883 (1884), p. 255. N. 40°2" W. 68°50'30", 547 fathoms. -- GÜNTHER, Rep. Voy. Challenger, vol. 22, 1887, p. 248 (note). -- VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p. (318) 319 (diagnosis in key). -- GOODE and BEAN, Oceanic Ichth., 1895, p. 165, pl. 50, fig. 184 (type), pl. 52, fig. 191 a (head below) b (ventrals) (N. 32°39' W. 76°50' 30", 478 fathoms; N. 32°39' W. 70°1', 407 fathoms). -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 615 (compiled).

Depth 6 7/8 to 8 7/8, 3 to 3 1/3 to vent; head 6 1/3 to 7 2/3 to caudal base, 2 2/3 to 3 to vent, width 2 1/2 to 3. Snout 3 2/3 to 4 2/3 in head; eye 5 to 5 2/5, 1 to 1 1/2 in snout, greater than interorbital in young to subequal with age; maxillary reaches 1/4 to 2/5 in eye, length from snout tip 2 2/5 to 3 1/8 in head; interorbital 5 to 5 7/8, broadly convex. Gill rakers 3 + 14, short, lanceolate, 1/2 of gill filaments, which 1 4/5 in eye.

Scales very minute, imbricated, adherent. Lateral line distinct, axial along side to middle of tail.

D. XI, last 4 to 5 in head; A. XVIII to XXI, 138?, caudal 4 to 7 in head; pectoral 1 7/8 to 2; ventral 2 to 2 1/6, confluent.

Uniform brown. Edges of gill opening blackish. Iris gray brown.

Atlantic Ocean.

33327 U. S. N. M. N. 40°2' W. 68°50'. Albatross Station Length 510 mm. Type.

37856 U. S. N. M. N. 32°39' W. 76°50'30". In 478 fathoms. Albatross Station 2677. Length 292 to 318 mm. 2 examples.

44246 U. S. N. M. N. 32°39' W. 70°1'. In 407 fathoms. Albatross Station 2676. Length 222 mm.

Notacanthus bonaparte Risso

Notacanthus bonaparte RISSO, Archiv Naturges., 1840, p. 376, pl. 10, Nice.

Notacanthus bonaparti FILIPPI and VERANY, Mem. Accad. Sci. Torino, ser. 2, vol. 18, 1859, p. 180 (Nice).

-- VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, pp. 317, 319 (diagnosis in key), p. 387.

Notacanthus bonapartii CANESTRINI, Fauna Italia, Pesce, 1874, p. 118 (compiled). -- MOREAU, Hist. Nat. Poiss. France, vol. 3, 1881, p. 161; Manuel Ichth. France, 1892, p. 378 (Mediterranean; Nice). -- GOODE and BEAN, Oceanic Ichth., 1895, p. 166, pl. 50, fig. 185, text fig. (compiled; note on Giglioli's materials).

Notacanthus mediterraneus FILIPPI and VERANY, Mem. Accad. Sci. Torino, ser. 2, vol. 18, 1859, p. 190. Nice. -- GUNTHER, Cat. Fishes Brit. Mus., vol. 3, 1861, p. 545 (compiled). -- CANESTRINI, Fauna Italia, Pesce, 1874, p. 118 (Nice). -- MOREAU, Hist. Nat. Poiss. France, vol. 3, 1881, fig. 158. -- VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, pp. 317, 319, 325, pl. 27, figs. 2, a-c (Coast of Soudan, 932 to 1232 meters; Banc d' Arguin, 1495 meters).

Depth 12 to 20, 5 to anal; head 6 to 7 to caudal base, 2 3/4 to anal. Snout 4 in head; eye 5 3/4, 1 1/3 in snout; maxillary reaches 1/2 in eye, length from snout tip 2 1/4 in head; premaxillary with 24 curved teeth, each dentary with 26 or 27; interorbital low.

Scales 299 in lateral line; 19 above, 25 below.

D. VII; A. XI, 120?; pectoral 2 1/8 in head; ventral 2 1/2, rays III, 6.

Sepia brown. Edges of mouth and gill openings, also soft anal, blackish. Length 314 mm. (Vaillant.)

Atlantic, Mediterranean.

Notacanthus sexspinis Richardson

Notacanthus sexspinis RICHARDSON, Ichth. Voy. Erebus and Terror, 1846, p. 54, pl. 32, figs. 4-11. King George's Sound, Western Australia. -- GUNTHER, Rep. Voy. Challenger, vol. 22, 1887, p. 243, pl. 60, figs. 9-15, pl. 61, fig. A (off South Austrdia and New Zealand). -- VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p. (317) 319 (diagnosis in key). -- GOODE and BEAN, Oceanic Ichth., 1895, p. 163 (New Zealand; Cood Strait), p. 164 (diagnosis in key). -- GILCHRIST and VON BONDE, Fisher. Marine Biolog. Survey South Africa, Rep. No. 3, 1922 (1924), No. 7, p. 11 (off South Africa, 200 to 470 fathoms).

Notacanthus annectens BOULENGER, Marine Investig. South Africa, 1904, p. 167, pl. 11. Off Cape Peninsula, Table Mt. bearing N. 79° E.

Depth 10 3/5, 4 2/5 to vent; head 7 3/5 in total, 3 to vent, width 4 1/4. Snout 3 4/5 in head; eye 5, 1 2/5 in snout, greatly exceeds interorbital; maxillary reaches 2/5 in eye, length 2 3/5 in head; teeth lanceolate, small, uniserial and continuous in jaws and on palatines; interorbital 8, rather low, convex. Gill rakers 3 - 12, lanceolate, slender, rather flexible, longest 1 2/3 in eye; gill filaments 3/5 gill rakers.

Scales small, adherent, cycloid. Lateral line continuous to middle of tail, axial.

D. VIII, last spine 4 in head; first spine inserted midway between ventral and anal origins; A. XIV, 123?; caudal 4 1/4 in head; pectoral 1 3/4; ventral 2.

Uniform pale brown. Iris pale. Inside mouth and gill opening blackish. Fins very pale to whitish.

Off Western Australia, New Zealand and South Africa. The following is condensed from Günther:

Depth 9 1/2, 3 3/4 to vent; head 7 1/3 to caudal base, width 2 1/8. Snout 3 3/4 in head; eye 5 1/8. Snout 3 3/4 in head; eye 5 1/8, 1 1/3 in snout; maxillary reaches 1/2 in eye, length from snout tip 2 1/3 in head; teeth uniserial, 28 on each premaxillary, 25 on each dentary, palatine series 54; interorbital moderately high. Gill rakers 18, moderately long, soft.

Scales very thin, small, cycloid, suboval. Lateral line axial, disappears about middle of tail.

D. VII to IX; A. XIII to XV, 160; caudal 6 in head; pectoral 1 9/10, rays 12; ventral 2 3/4 in head, rays 7 or 8.

Brown, inside cavities black. Length 460 to 508 mm.

12625 U. S. N. M. New Zealand. British Museum. Length 315 mm.

Notacanthus phasganorus Goode

Notacanthus phasganodus GOODE, Proc. U. S. Nat. Mus., vol. 3, April 18, 1881, p. 535. From stomach of Somniosus brevipinnis on Grand Bank of Newfoundland. -- GÜNTHER, Rep. Voy. Challenger, vol. 22, 1887, p. 249 (compiled). -- JORDAN and GILBERT, Bull. U. S. Nat. Mus., No. 16, 1882, p. 900 (copied). -- VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p. (318) 319 (diagnosis in key). -- GOODE and BEAN, Oceanic Ichth., 1895, p. 167, pl. 50, fig. 186 (type). -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 616 (compiled).

Depth 9, 4 to anal; head 7 2/5 in total, 3 1/5 to anal, width 2 3/4. Snout 4 1/8 in head; eye 6 1/8, 1 1/3 in snout, 1 2/5? in interorbital; maxillary reaches 3/4 in eye, length from snout tip 2 2/5 in head; upper teeth blunt, slender, well spaced, uniform, 32 each side and lower teeth shorter, more slender and in double rows; 2 to 4 irregular series of slender short teeth on palatines; interorbital 5 in head, broadly convex, low. Gill rakers 3 + 9, lanceolate, tapering from rather robust bases to short slender points, 1 3/4 in gill filaments, which little less than eye.

Scales 400? in lateral line; 20 above, 36 below, 40 post-ocular. Ventrals scaly. Lateral line axial, continued to last third of tail.

D. X, first spine inserted behind ventral origin; A. XIX, 130; pectoral 2 3/5 in head, rays 17, ventral 4 1/10, rays II, 8 or 9.

Light brown, nearly cinnamon or russet. Lower surface of head little darker. Inside gill opening blackish brown. Fins all brown.

Atlantic Ocean. Known by its deep robust body and very small scales.

25972 U. S. N. M. From stomach of Somniosus brevi-
pinnis. Schooner "Gatherer." Capt. Briggs Gilpatrick.
Length 910 mm. Type.

Notacanthus chemnitzii Bloch

Notacanthus chemnitzii BLOCH, Abhandl. Böhm. Gesell. Wiss., 1787 (1788), p. 278. -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 614 (compiled).

Notacanthus chemnitzi JORDAN and GILBERT, Bull. U. S. Nat. Mus., No. 16, 1882, p. 370 (compiled).

Notocanthus nasus BLOCH, Naturg. Aus. Fische, vol. 9, 1795, p. 113. "East Indies." -- SHAW and NODDER, Natural. Miscellany, vol. 12, 1801, pl. 466 (Indian Seas?). -- SWAINSON, Nat. Hist. Animals, vol. 2, 1839, p. 241 (reference).

Notacanthus nasus BLOCH, Naturg. Aus. Fische, vol. 9, 1795, pl. 431. -- LACÉPÈDE, Hist. Nat. Poiss., vol. 5, 1803, pp. 290, 291 (copied). -- CUVIER, Hist. Nat. Poiss., vol. 8, 1831, p. 467, pl. 241 (compiled). -- VALENCIENNES, Regne Animal, Cuvier, Ed. Ill., 1839, pl. 55, fig. 2. -- GAIMARD, Voy. Island Gronl., Zool., Poiss., 18, pl. 11 (Iceland). -- GUNTHER, Cat. Fishes Brit. Mus., vol. 3, 1861, p. 544 (note). -- LUTKEN, Vidensk. Medd. naturh. Foren. Kobenhavn, 1878, p. 145 (South Greenland). -- GUNTHER, Rep. Voy. Challenger, vol. 22, 1887, p. 248 (compiled). -- VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p. (317) 319 (diagnosis in key). -- GOODE and BEAN, Oceanic Ichth., 1895, p. 164, pl. 50, fig. 183 (copied) (types).

Acanthonotus nasus SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 390, pl. 77 ("mari Islandico").

Campylodon fabricii REINHARDT, Vidensk. Selsk. naturvid. of mathem. Afhandl., vol. 7, 1838, p. 120. Greenland.

Depth 9 2/5, 4 1/2 to vent; head 7 4/5 to caudal base, 3 1/2 to vent. Snout 2 1/2 in head; eye 8 1/4, 3 in snout; maxillary reaches 1/4 in eye, length from snout tip 2 1/5 in head, expansion equals eye,. length 2 1/8 in head; premaxillary teeth 35 on each side.

Scales 40 transversely between lateral line and ventral outline.

D. XI; A. XV, 118; caudal 4 1/4 in head; pectoral 2 1/8, rays 19; ventral 2 1/3 in head. Length 85 mm.

(Goode and Bean.)

Atlantic Ocean.

Notacanthus moseleyi (Goode and Bean)

Gigliolia moseleyi GOODE and BEAN, Oceanic Ichth., 1895, p. 169, pl. 51, fig. 187, pl. 52, fig. 193 (based on GÜNTHER).

Notacanthus moseleyi BARNARD, Ann. South African Mus., vol. 21, pt. 1, June 1925, p. 171 (off Cape Point, 500 fathoms).

Notacanthus bonapartii (not RISSO) GUNTHER, Rep. Voy. Challenger, vol. 22, 1887, p. 249, pl. 61, fig. C. South west coast of South America, 400 fathoms.

Depth 9, 3 1/2 to vent; head 6 in total, 2 1/3 to vent, width 2 1/2. Snout 4 in head; eye 4 7/8, 1 1/4 in snout, less than interorbital; maxillary reaches 1/2 in eye, expansion 2 2/5 in eye, length 2 1/2 in head; 20 teeth on each side of upper jaw.

Scales minute, smooth, imbricate and adherent.

D. VIII or IX; A. XV to XVIII, 150; pectoral 2 1/4 in head, rays 9; ventral 2 7/8 in head, rays I, 7, confluent.

Color uniform. Length 290 mm. (Günther.)

South Atlantic and south eastern Pacific Oceans.

Family LIPOGENYIDAE

Body elongate, compressed, tail long and tapering. Head small, compressed. Muzzle obtuse. Eye small. Mouth rounded, inferior, suctorial. Lower jaw imperfect, rami separated medially, connected with corresponding sides of upper jaw, invested with thick, transversely plicated, horseshoe shaped lip, reflected upwards behind on cheeks. No teeth. Scales minute. Lateral line axial, complete. Dorsal premedian, with 4 or 5 partially connected graduated spines in front and few branched rays forming elevated triangular fin. Anal long series of low spines beginning under dorsal and passing into similar short rays posteriorly. Pectoral low. Ventrals inserted before dorsal, similar.

One genus.

Genus Lipogenys Goode and Bean

Lipogenys GOODE and BEAN, Proc. U. S. Nat. Mus., vol. 17, 1894 (1895), p. 469. Type Lipogenys gillii GOODE and BEAN, monotypic.

Body slender. Snout obtuse, compressed. Eye advanced. Mouth circular anteriorly, with thick, contractile lip, cleft posteriorly, flanked by fleshy flaps. Conceales spine at end of maxillary. Front nostril in short tube, hind one long and below short flap. Scales very numerous. Dorsal lower than body depth. Caudal distinct, very small, confluent with long anal. Pectoral rounded, short. Ventral with 3 spines and 7 rays.

Lipogenys gillii Goode and Bean

Lipogenys gillii GOODE and BEAN, Proc. U. S. Nat. Mus., vol. 17, 1894, (1895), p. 469, pl. 18, fig. 3. N. 37° 46' 30" W. 73° 56' 30", in 865 fathoms; Oceanic Ichth., 1895, p. 173, pl. 51, fig. 190, pl. 52, fig. 196 A-B (type). -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 619 (compiled).

Depth 9 3/4, 3 3/4 to anal; head 8 to anal, 3 1/6 to anal. Snout to eye 3 1/2 in head; orbit 5 1/6; eye 6 1/2, 1 7/8 in snout, 1 3/5 in interorbital; maxillary reaches 1/2 in eye, length 2 1/3 in head; as viewed below upper lip horse shoe shaped, with deep narrow grooves; interorbital 5 1/6, convex. Apparently no gill rakers; gill filaments equal orbit.

Scales very small, adherent. Lateral line axial, continuous to middle of tail.

D. V, 5, second branched ray 2 1/8 in head; A. XLI, 88, of rays anterior 10 stiff though articulated and branched, longest ray 3 2/5 in head; caudal 4; pectoral 1 2/3; ventral 1 4/5, rays III, 7, fins not confluent.

Uniform light brown. Iris dark neutral gray. Inside mouth and gill openings blackish. Under side of gill covers dark, showing dark at edges of grayish opercles. Fins brownish.

Atlantic Ocean.

39212 U. S. N. M. N. 37° 46' 30" W. 73° 56' 30". In 865 fathoms. Albatross Station 2742. Length 446 mm. Type.

Order Lyopomi

Body slender, compressed, tapers behind. Abdomen rounded. Head partly conic. Mouth inferior. Bones of jaws, palatines and pterygoids complete, normal. Teeth small, villiform. Preopercle entirely detached from suspensorium, rudimentary, connects only with lower jaw. Opercle normally connected. Subopercle enlarged, partly replaces usual position of preopercle, together with suborbital chain, which extended backward to opercular edge. Cranium with condyle confined to basioccipital. Gills 4, slit behind fourth. No. pseudobranchiae. Branchiostegals 14. Air vessel large, simple. Stomach coecal. Pyloric coeca in moderate number. Intestine short. Ovaries not closed. Scapular arch formed by proscapula, posterotemporal and posttemporal, latter discrete from side of cranium and impringing on supraocciptial. Hypercoracoid and hypocoracoid plate like, foramen in upper edge of latter. No mesocroacoid. Vertebrae 60 or more, front ones separate. Actinosts normal. Scales small, deciduous. Lateral line present. Dorsal fin short, high. No adipose fin. Anal extremely long, extends from vent to end of tail. No caudal fin. Pectoral placed high. Ventrals advanced.

Deep sea fishes, included in the single family.

Family HALOSAURIDAE

Body elongate, long slender tail narrowed into sort of filament. Head depressed in front. Snout flattened, protrudes beyond mouth. Eye rather large. Mouth horizontal, moderate, front edge formed by premaxillary, hind edge by maxillary, which moderately wide. Teeth in bands in jaws, on rudimentary palatines and tyerygoids, none on vomer and tongue. Facial bones with large muciferous cavities. Bones of head unarmed. Gill rakers short. Gill membranes free from isthmus. Scales cycloid, present on trunk and sides of head. No axillary scales. Lateral line low, extends along sides of belly, its scales enlarged, each in pouch of black skin with luminous organ at base. Dorsal inserted behind ventral, before vent. Anal rays about 200. Pectoral long, narrow. Ventral moderate.

Analysis of genera

a^1. Head without prominent lateral ridges; scales in lateral line scarcely enlarged.

Halosaurus.

a^2. Head with prominent lateral ridges; scales in lateral line enlarged. Halosauropsis.

Genus Halosauropsis Collett

Halosauropsis COLLETT, Res. Camp. Sci. Monaco, vol. 9, 1895, p. 143. Type Halosaurus macrochir GUNTHER, orthotypic.

Aldrovandia GOODE and BEAN, Oceanic Ichth., 1895, p. 132. Type Halosaurus rostratus GUNTHER.

(Aldrovandium CHIAJE 1844 not involved.)

Head with prominent lateral ridges. Snout pointed. Vertex scaleless. Scales of lateral line enlarged, provided with photophores. No second dorsal fin. Anal moderate, high, third to fourth of dorsal. Ventrals normal.

Analysis of species

a[1]. Orbit moderate, more than 6 in head.

b[1]. Maxillary not reaching orbit or eye; postocular scaly.

c[1]. Orbit 7 1/4 in head; enlarged scales 29 to ventral; 12 above lateral line. affinis.

c[2]. Orbit 11 3/4 in head; enlarged scales 24 to ventral; 13 above lateral line. rostratus.

b[2]. Maxillary reaches orbit or eye.

d[1]. Dorsal inserted over or close behind ventral base, not posterior to first fifth of space between ventral and anal origins.

e[1]. Enlarged scales 22 to 27 to ventral.

f[1]. Head naked above; 14 scales above lateral line. verticalis.

f[2]. Head scaly above; 17 scales above lateral line. kauaiensis.

e[2]. Enlarged scales 29 to ventral; 11 scales above lateral line; head scaly above. proboscideus.

e[3]. Enlarged scales 36 to ventral; 14 scales above lateral line; head naked above. macrochir.

d2. Dorsal inserted well behind ventral posterior to first fifth of space between ventral and anal origins.

g[1]. Dorsal origin at first fourth between ventral and anal; enlarged scales 27 to 30 to ventral; 10 above lateral line. gracilis.

g[2]. Dorsal origin at first third between ventral and anal; enlarged scales 18? to ventral; 14 above lateral line. mediorostris.

a[2]. Orbit large, less than 6 in head.

h[1]. Orbit 5 1/4 in head; lower gill rakers 11; scales 25? to ventral; head naked above. phalacrus.

h[2]. Orbit 4 1/8 to 4 1/3; lower gill rakers 9; scales 40 to 50 to ventral; head scaly above. ridgewayi.

Halosauropsis affinis (Günther)

Halosaurus affinis GUNTHER, Ann. Mag. Nat. Hist., ser. 4, vol. 20, 1877, p. 444. South of Japan; Rep. Voy. Challenger, vol. 22, 1887, p. 241, pl. 59, fig. B (type). -- ALCOCK, Ann. Mag. Nat. Hist., ser. 6, vol. 6, 1890, p. 309 (Laccadive Sea, 100 fathoms); Journ. Asiatic Soc. Bengal, vol. 65, pt. 2, 1896, p. 335 (reference). -- GILCHRIST, Marine Investig. South Africa, vol. 4, 1906 (1908), p. 171 ( ). -- GILCHRIST and VON BONDE, Fisher. Marine Biolog. Survey South Africa, Rep. No. 3, 1922 (1924), No. 7, p. 10 (off South Africa, 580 to 1400 fathoms).

Aldrovandia affinis GOODE and BEAN, Oceanic Ichth., 1895, p. 130 (diagnosis in key). -- BARNARD, Ann. South African Mus., vol. 21, pt. 1, June 1922, p. 167 (off Cape Point and Table Bay, 500 to 1400 fathoms).

Halosaurus anguilliformis ALCOCK, Ann. Mag. Nat. Hist., ser. 6, vol. 6, 1889, p. 453. N. 6° 32' E. 79° 37', 675 fathoms, Gulf of Manaar; Journ. Asiatic Soc. Bengal, vol. 65, pt. 2, 1896, p. 336 (reference); Cat. Deep Sea Fishes Indian Mus., 1899, p. 184 (Andaman Sea, off Laccadive Islands, 100 fathoms; Gulf of Manaar, 675 fathoms).

Aldrovandia anguilliformis GOODE and BEAN, Oceanic Ichth., 1895, p. 130 (diagnosis in key).

Halosaurus hoskynii ALCOCK, Ann. Mag. Nat. Hist., ser. 6, vol. 6, 1890, p. 309. Off Elicapeni Bank, Laccadive Sea, in N. 11° 12' 47" W. 74° 25' 30", 1000 fathoms; Illustrat. Zool. Investigator, Fishes, pt. 1, 1892, pl. 7, fig. 3; Journ. Asiatic Soc. Bengal, vol. 65, p. 2, 1896, p. 336 (reference). -- GOODE and BEAN, Oceanic Ichth., 1895, p. 130 (reference).

Depth 7 1/3 to vent; head 2 1/4, width 3 1/3. Snout 2 1/4 in head; eye 7 1/4, 3 1/4 in snout, equals interorbital; maxillary not reaching front eye edge, length 2 2/5? in head; palatine band of teeth not wider than premaxillary, only slightly separated from that of other side and somewhat distant from pterygoid teeth; interorbital 7 1/4, low.

Scales 29 enlarged to vent; 12 above, 2 below. Scales on postocular. Scales very caducous, most all fallen.

D. I, 11, first branched ray 2 2/5 in head, fin origin over ventral base close behind ventral origin; pectoral 1 4/5 in head; ventral 3 1/4.

Light colored. Head, vent and hind part of tail black. Length 422 mm. (Günther.)

Pacific and Indian Oceans.

Halosauropsis rostratus (Günther)

Halosaurus rostratus GUNTHER, Ann. Mag. Nat. Hist., ser. 5, vol. 2, 1878, p. 251. Mid Atlantic, 2750 fathoms; Rep. Voy. Challenger, vol. 22, 1887, p. 241, pl. 59, fig. D. (type).

Aldrovandia rostrata GOODE and BEAN, Oceanic Ichth., 1895, p. 133, pl. 41, fig. 154 (compiled). -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 609 (copied).

Halosauropsis rostratus ROULE, Res. Camp. Sci. Monaco, vol. 53, 1919, p. 29 (N. 15° 17' W. 23° 1' 45", 1311 meters, off Cape Verde).

Depth 6 to vent; head 2 3/5 to vent, width 4. Snout 2 in head; eye 11 3/4, 5 3/4 in snout, 1 2/3 in interorbital; maxillary reaches 9/10 to eye, length from snout tip 2 1/8 in head; palatine teeth in crescentic bands, rather widely separated from pterygoid band; interorbital 6 2/5, low.

Scales 24 enlarged in lateral line to vent; 13 above. Postocular scaly. Fins scaleless. Nearly all scales lost, only some in lateral line remain.

D. 10, third ray 3 in head, fin origin at first 2/5 between ventral and anal origins; first anal ray 4 4/5 in head; pectoral 2 1/8; ventral 3 1/2, rays 9 or 10.

Light colored, lower part of head and gill cover black. Abdominal region blackish. Length 500 mm. (Günther.)

Atlantic Ocean.

Halosauropsis verticalis (Gilbert)

Halosaurus verticalis GILBERT, Bull. U. S. Fish Comm., vol. 23, pt. 2, 1903 (1905), p. 611. Near Kauai, 437 to 632 fathoms; off Bird Island, 318 to 800 fathoms. -- FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 35 (Hawaii).

Albrovandia verticalis GILBERT, Bull. U. S. Fish Comm., vol. 23, pt. 2, 1903 (1905), pl. 75.

Depth 23, 6 1/5 to 6 4/5 to anal; head 6 4/5 in total, 2 to 2 1/6 to anal, width 3 7/8 to 4. Snout 2 1/3 in head; orbit 6 1/5 to 6 2/5; eye 9 to 9 1/4, 4 1/4 to 4 1/3 in snout, 1 1/8 to 1 1/5 in interorbital; maxillary reaches 1/5 to 1/3 in eye, length from snout tip 2 1/4 in head; teeth in villiform bands in jaws, palatine bands closely approximated, pterygoid bands much longer and narrower; interorbital 7 to 8 1/2, with median depression widening and deeper on occiput. Gill rakers 6 + 18, finely and slenderly lanceolate, nearly equals orbit; gill filaments 2/5 gill rakers.

Scales 25 enlarged to vent; 14 above, 40 to 45 predorsal. Postocular scaly, top of head scaleless. Fins scaleless. Scales very caducous, most all fallen.

D. I to III, 9, I, first branched ray 2 1/8? to 2 1/5 in head, fin origin at first fifth between ventral and anal origins; first anal ray 3 4/5 to 4 in head; pectoral 1 3/5; ventral 2 4/5 to 3.

Brownish black on back and sides with contrasted black median streak behind dorsal fin, less conspicuous posteriorly. Head, belly and lower parts black, also inside mouth and gill openings. Fins dusky brown, variably paler terminally.

Pacific Ocean. Known by its finely lanceolate gill rakers, black median postdorsal band and long pectorals reaching ventral bases.

51645.U. S. N. M. Vicinity Kauai. In 437 to 632 fathoms. Albatross Station 4141. Length 283 mm. Type.

51674 U. S. N. M. Albatross Station . Length 112? to 190? mm. 2 examples.

Halosauropsis kauaiensis (Gilbert)

Halosaurus kauaiensis GILBERT, Bull. U. S. Fish Comm., vol. 23, pt. 2, 1903 (1905), p. 611. Kauai Island, 724 to 804 fathoms; off Molokai; Bird Island; 376 to 385 fathoms. -- FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 35 (Hawaii).

Aldrovandia kauaiensis GILBERT, Bull. U. S. Fish Comm., vol. 23, pt. 2, 1903 (1905), pl. 74.

Depth 14 1/2 to 18 1/3, 5 1/5 to 6 to anal; head 6 1/3 to 7 1/3 to end of tail, 2 1/8 to 2 3/5 to anal, width 3 2/3 to 3 3/4. Snout to eye 2 1/4 to 2 3/5 in head; eye 8 to 9 4/5, 3 1/4 to 4 in snout, 1 1/5 to 1 2/3 in interorbital; maxillary reaches to or 1/5 in eye, length from snout tip 2 1/5 to 2 2/5 in head; teeth villiform, premaxillary band half length maxillary band, palatine band posteriorly nearly wide as premaxillary and closely approximating, pterygoid band very narrow; interorbital 5 1/2 to 6 3/5, convex. Gill rakers 5 or 6 + 17 to 19, lanceolate, little longer than gill filaments or 1 4/5 in eye.

Scales 22 to 27 enlarged in lateral line to vent; 17 above, 4 below, 35 to 40 predorsal to occiput. Top of head naked, postocular scaly. Dorsal and anal scaly. Scales fairly adherent. Scales with 11 or 12 long basal radiating striae; circuli very fine and well crowded apically so only rather narrow apical border entire.

D. I, 8, I or I, 9, I, second branched ray 2 to 2 1/3 in head, fin origin at first eighth between ventral and anal origins; anal height anteriorly 4; tail extended in long filament; pectoral 1 3/5 to 1 2/3; ventral 3 1/10 to 3 1/4.

Dark brown, many of scales with light pearly median spot. Under parts, including snout, sides of head, subpectoral region and gill openings black, more bluish well within latter. Iris gray. Under surface of head neutral violaceous black. Dorsal and pectoral dusky basally, paler terminally. Anal dusky, lighter basally. Ventral dusky. Young with black vertebral band behind dorsal fin.

Pacific Ocean. This species greatly suggests Halosaurus macrochir, especially in its long pectorals, scaleless vertex, though its dorsal apparently lower and gill rakers more numerous.

51612 U. S. N. M. Vicinity of Kauai. In 724 to 804 fathoms. Albatross Station 4018. Length 648 mm. Type.

51703 U. S. N. M. Albatross Station . Length 283 to 628 mm. Paratypes.

Halosauropsis broboscideus (Gilbert)

Halosaurus proboscidea GILBERT, Bull. U. S. Fish Comm., vol. 23, pt. 2, 1903 (1905), p. 612. Kauai Channel, between Molokai and Oahu, 460 to 470 fathoms; Kaiwi Channel and Kauai, 438 to 476 fathoms. -- FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 35 (compiled).

Aldrovandia proboscidea GILBERT, Bull. U. S. Fish Comm., vol. 23, pt. 2, 1903 (1905), p. 612, pl. 76.

Depth 18, 6 1/4 to anal; head 7 2/5 in total, 2 4/5 to anal, width 3 1/2. Snout to eye 2 1/3 in head; orbit 7; eye 8, 3 3/4 in snout, subequal with interorbital; maxillary reaches to eye, length from snout tip 2 1/4 in head, without spine; teeth rather finely villiform bands in jaws; crecentic palatine bands fully confluent anteriorly on median line, wider than premaxillary bands, pterygoid bands very narrow; interorbital equals eye, low. Gill rakers 4 + 11, little longer than gill filaments or 1 3/5 in orbit.

Scales, 29 large scales in lateral line to vent, continued along above anal base first third its length; 11 scales above. Entire top of head and postocular scaly. Fins scaly basally. Scales very caducous, most all now fallen. Scales with 14 or 15 basal radiating striae; circuli fine.

D. II, 8, first branched ray 2 2/5 in head, fin origin nearly at first seventh between ventral and anal origins; anal height anteriorly 4 1/2?; pectoral 1 4/5; ventral 2 3/4.

Brown, nearly uniform. Head dark neutral gray, blackish on branchiostegal membrane. Inside mouth and gill opening blackish. Iris dark gray. Fins brownish.

Pacific Ocean.

51614 U. S. N. M. Kaiwi Channel, between Molokai and Oahu. In 460 to 470 fathoms. Albatross Station 4111. Length 412 mm. Type.

Halosauropsis macrochir (Günther)

Halosaurus macrochir GUNTHER, Ann. Mag. Nat. Hist., vol. 2, ser. 5, 1878, p. 250. Atlantic, 1090 fathoms; midway between Cape of Goode Hope and Kerguelen's Land, 1375 fathoms. -- MINER, Rep. U. S. Fish Comm., pt. 11, 1883 (1885), p. 195 (N. 38° to 39° W. 70° to 72°, 1091 to 1451 fathoms). -- GUNTHER, Rep. Voy. Challenger, vol. 22, 1887, p. 237, pl. 59, fig. A, pl. 60, figs. 1-2 (type; off Gibralter, 1090 fathoms; near Marion Island, 1375 fathoms). -- VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p. 170, pl. 16, fig. 2 a-e (coasts of Morocco; Azores; 2200 to 2995 meters). -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 609 (copied).

Aldrovandia macrochira GOODE and BEAN, Oceanic Ichth., 1895, p. 133, pl. 41, fig. 155-a (N. 17° to 41° W. 65° to 76°, 647 to 1434 meters).

Aldrovandia macrochir BARNARD, Ann. South African Mus., vol. 21, pt. 1, June 1925, p. 68, pl. 8, fig. 4 (off Cape Point and Table Bay, 800 to 1400 fathoms).

Halosauropsis macrochir COLLETT, Res. Camp. Sci. Monaco, vol. 10, 1896, p. 146, pl. 5, figs. 23-b (N. 39° 18' 5" W. 33° 22' 15", 1372 meters). -- ZUGMAYER, Res. Camp. Sci. Monaco, vol. 35, 1911, p. 12 (N. 43° 45' 30" W. 9° 41', 2320 meters). -- MURRAY and HJORT, Depths of the Ocean, 1912, p. 396, fig. 103b (between Gan Canara and Cape Bojador, from Gran Canara to Fayal, Newfoundland to Glasgow, 1797 to 3120 meters). -- ROULE, Res. Camp. Sci. Monaco, vol. 52, 1919, p. 29 (N. 38° 40' W. 26° 00' 45", 1805 meters; N. 38° 45' 30" W. 28° 7' 45", 1095 meters off Azores). -- VAILLANT, Res. Camp. Sci. Monaco, vol. 52, 1919, p. 130 (N. 38° 27' W. 26° 30' 15", 1165 meters; N. 39° 11' W. 30° 44' 40", 1846 meters; N. 37° 40' W. 26° 26' 15", 1919 meters).

Halosaurus goodei GILL, Proc. U. S. Nat. Mus., vol. 6, 1883 (1884), p. 257. N. 38° to 39° W. 69° to 70°, 1098 to 1731 fathoms. -- MINER, Rep. U. S. Fish Comm., pt. 11, 1883 '1885), p. 195 (N. 39° 26' 16" W. 70° 2' 37", 1362 fathoms).

Aldrovandia goodei GOODE and BEAN, Oceanic Ichth., 1895, p. 133 (type; west Atlantic materials; 1098 to 1362 fathoms). -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 610 (compiled).

Halosaurus niger GILCHRIST, Marine Investig. South Africa, vol. 4, 1908, p. 170, pl. 51. Off Cape Point, 800 to 930 fathoms. -- GILCHRIST and VON VONDE, Fisher. Marine Biolog. Survey South Africa, Rep. No. 3, 1922 (1924), No. 7, p. 10 (off South Africa, 1400 fathoms).

Depth 11 1/8 to 19 1/5, 4 2/3 to vent; head 7 1/6 to 7 1/4 in total, 2 1/3 to 3 to anal, width 2 4/5 to 3 3/4. Snout to eye 2 1/8 to 2 2/5 in head; orbit 7 4/5; eye 9 to 11 3/4, 3 1/4 to 5 1/5 in snout, 1 1/4 to 2 4/5 in interorbital; maxillary reaches 9/10 to or 1/4 in orbit, or to front edge, length from snout tip 2 1/4 to 2 1/3 in head; teeth finely villiform, premaxillary band broader than maxillary band, palatine patches oval and separated, pterygoid in very narrow band; interorbital 4 2/5 to 7 3/4, below, broadly convex. Gill rakers 4 or 5 + 10 to 14, lanceolate, rather robust, 1 3/5 in orbit; gill rakers 3/4 gill filaments.

Scales 36 enlarged in lateral line to anal, then about 28 to first third of anal; 14 above, 4 below, 31 predorsal to occiput. Top of head naked, postocular scaly. Fins scaly. Scales very caducous, mostly all fallen. Scales with 5 to 7 short marginal basal radiating striae; circuli very fine, numerous, not extended apically.

D. I to III, 9, I or 10, I, first branched ray 1 2/3 to 2 1/8 in head, fin origin nearly over ventral with age, in young at first eighth between ventral and anal origins; first anal ray 2 4/5 to 4 1/5; tail long slender tapering filament, caudal very short; pectoral 1 9/10 to 1 1/6, ventral 2 1/5 to 2 2/5.

Dark brown to brownish black. Head black. Iris neutral black. Inside mouth and gill openings black. Large scales of lateral line often neutral dusky. Fins dark brownish.

Atlantic and Antarctic Oceans. The most abundant species in the collections, variable, though the characters such as the long pectoral, advanced dorsal and short snout are more pronounced with age.

33281 U. S. N. M. Length 650 mm.

33312 U. S. N. M. N. 39° 41' W. 69° 20' 20". In 1106 fathoms. Albatross Station 2051. Length 350 to 455 mm. 4 examples.

33329 U. S. N. M. Length 528 to 704 mm. 6 examples.

33336 U. S. N. M. Length 624 to 711 mm. 3 examples.

33338 U. S. N. M. Albatross Station . Length 430 to 713 mm. 9 examples. Two as Aldrovandia goodei.

33365 U. S. N. M. N. 41° 9' 10" W. 66° 2' 20". In 1255 fathoms. Albatross Station 2077. Length 227 to 690 mm. 2 examples.

33585 U. S. N. M. N. 39° 22' 20" W. 70° 52' 20". Albatross Station . Length 632 mm.

35500 U. S. N. M. Albatross Station . Length 504 mm.

35501 U. S. N. M. Albatross Station . Length 616 to 658 mm. 2 examples.

35551 U. S. N. M. N. 39° 47' W. 70° 30' 30". Albatross Station . Length 290 to 395 mm. 2 examples.

35599 U. S. N. M. Length 368 to 716 mm. 17 examples.

38098 U. S. N. M. Albatross Station . Length 464 mm.

38101 U. S. N. M. Albatross Station . Length 628 mm.

38138 U. S. N. M. Albatross Station . Length 660 mm.

38139 U. S. N. M. Albatross Station . Length 730 mm.

38144 U. S. N. M. Albatross Station 2727. Length 482 to 514 mm. 2 examples.

39196 U. S. N. M. Albatross Station . Length 617 mm.

39198 U. S. N. M. Albatross Station 2748. Length 643 mm.

44329 U. S. N. M. Albatross Station 2111. Length 295 to 350? mm. 2 examples.

44330 U. S. N. M. Albatross Station 2074. Length 359 mm.

44331 U. S. N. M. Albatross Station 2116. Length 394? to 433 mm. 2 examples.

44334 U. S. N. M. Albatross Station 2550. Length 261 mm.

44335 U. S. N. M. Albatross Station 2533. Length 290 to 422 mm. 2 examples.

44860 U. S. N. M. N. 35° 45' 23" W. 74° 31' 25". Albatross Station 2116. Length 692 mm.

46806 U. S. N. M. Albatross Station 2682. Length 555 mm.

84529 U. S. N. M. Albatross Station 2677. Length 165? mm. As Halosaurus johnsonianus.

2 examples U. S. N. M. Albatross Station 113. Length 534 to 675 mm. 1883.

Halosauropsis gracilis (Goode and Bean)

Aldrovandia gracilis GOODE and BEAN, Oceanic Ichth., 1895, p. 134, pl. 42, fig. 157. Blake Station LXX, off Guadeloupe, 769 fathoms; N. 28° 2' 30" W. 87° 43' 45", 1430 fathoms; N. 28° 5' W. 87° 56' 15", 1330 fathoms. -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 610 (compiled).

Depth 20 2/3 to 21 1/4, 7 to 7 1/8 to anal; head 8 1/3 to 8 2/3 in total, 2 7/8 to 3 to anal, width 3 to 3 1/8. Snout to eye 2 1/10 to 2 1/3 in head; orbit 6 7/8 to 8 1/2; eye 9 4/5 to 10, 4 1/3 to 4 1/2 in snout, 1 3/4 to 1 7/8 in interorbital; maxillary reaches orbit or eye, length from snout tip 2 1/8 to 2 1/5 in head; teeth on maxillary in somewhat narrower bands than on premaxillary and mandible, palatime patches broader, well separated in front; interorbital 5 1/4 to 6 7/8, equals eye, low, broadly convex. Gill rakers 4 + 11, 1 2/5 in eye, twice gill filaments.

Scales 27 to 30 enlarged in lateral line to anal, then 23 along front of anal; 10 above, 4 below. Top of head scaleless, few scales on postocular. Fins scaly.

D. II, 9, I, second branched ray 2 1/8 to 2 1/5 in head, origin about first fourth between ventral and anal origins; first branched anal ray 3 1/5 to 4 in head; tail tapers in long filament; pectoral 2 to 2 7/8; ventral 2 3/4 to 3.

Body pale brown. Head pale, with whitish or silvery tints. Iris gray. Fins pale brownish or whitish.

Atlantic Ocean.

44327 U. S. N. M. Albatross Station 2381. Length 423 mm.

44328 U. S. N. M. Albatross Station 2380. Length 494 mm.

1 example U. S. N. M. N. 28° 2' 30" W. 87° 43' 45".

In 1430 fathoms. Albatross Station 2380. Length 490 mm.

Halosauropsis mediorostris (Günther)

Halosaurus mediorostris GÜNTHER, Rep. Voy. Challenger, vol. 22, 1887, p. 239, pl. 59, fig. C. N. 12° 21' E. 122° 15', west of Philippines, 700 fathoms. -- ALCOCK, Journ. Asiatic Soc. Bengal, vol. 63, pt. 2, 1894, p. 136 (off North Maldive atoll, 719 fathoms); vol. 65, pt. 2, 1896, p. 336 (reference); Cat. Deep Sea Fishes Indian Mus., 1899, p. 185 (Arabian Sea between Maldives and Cape Comorin, 719 fathoms).

Aldrovandia mediorostris GOODE and BEAN, Oceanic Ichth., 1895, p. 130 (diagnosis in key).

Depth 7 2/3 to vent; head 2 3/4, width 3 3/5. Snout 2 1/5 in head; eye 12 1/2, 6 in snout, 3 1/8 in interorbital; maxillary reaches nearly, but not quite, to eye, length from snout tip 2 1/5 in head; interorbital 5 4/5, low, convex. Gill rakers 3 + 14, lanceolate, equals gill filaments, 1 1/2 in eye.

Scales (pockets) about 44 along lateral line to vent, enlarged ones lost, possible 22? in same extent; 10 scales (pockets) above lateral line.

D. II, 10, I, first branched ray 2 7/8 in head, origin about first third between ventral and anal origins; third branched anal ray 4 in head; pectoral 2; ventral 3 1/10.

Brown, scale pockets all deeper or darker colored. Head with silvery gray below on underlaid neutral black. Gill openings and inside mouth and pharynx neutral black. Iris gray. Fins all pale brownish.

Indian Ocean, China Sea. My single example seems to agree with Günther's figure, especially in its maxillary not reaching the eye and the position of the dorsal fin.

10246. D. 5610. Batu Daka Island(S.), N. 87° W., 20. 9 miles (S. 0° 36' E. 122° 1'), Gulf of Tomini, Celebes. In 678 fathoms. November 19, 1909. Length 598 mm.

Halosauropsis phalacrus (Vaillant)

Halosaurus phalacrus VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p. 185, pl. 15, fig. 3, pl. 16, figs. 1 a-c. Off Morocco, Soudan, Azores, 1103 to 2220 meters. -- BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol. 15, Tiefsee-Fische, 1906, p. 253 (N. 1° 48' 2" E. 45° 42' 5", 1644 meters off north east coast of Africa). -- ZUGMAYER, Res. Camp. Sci. Monaco, vol. 35, 1911, p. 11 (N. 43° 45' 30" W. 9° 41', 2320 meters). -- ROULE, Res. Camp. Sci. Monaco, vol. 52, 1919, p. 28 (N. 27° 41' W. 17° 53' 45", 1786 meters; N. 16° 34' W. 23° 3' 15", 1477 meters). -- VAILLANT, Res. Camp. Sci. Monaco, vol. 52, 1919, p. 130 (N. 39° 21' 20" W. 31° 5' 45", 1360 meters).

Aldrovandia phalacrus GOODE and BEAN, Oceanic Ichth., 1895, p. 134, pl. 41, fig. 156 (compiled).

Depth 24 1/5, 9 to anal; head 8 in total, 3 to anal, width 3 3/5. Snout to eye 2 1/3 in head; orbit 5 1/4; eye 7 3/5, 3 1/5 in snout, 1 in interorbital; maxillary reaches eye, length from snout tip 2 1/4 in head; interorbital 7 3/5, low, nearly level. Gill rakers 5 - 11, rather robust, lanceolate, 1/2 in eye; gill filaments 3/4 of gill rakers.

Scales 25? enlarged in lateral line to anal and at least dozen more along front of anal base. Top of head scaleless. Scales very caducous, most all fallen.

D. II, 9, I, first branched ray 2 3/4 in head, origin at first eighth between ventral and anal origins; third anal ray 4 2/5? in head; tail long, slender, tapering to slender filament; pectoral 3; ventral 3.

Body pale brown. Head neutral dusky. Iris grayish. Inside mouth and gill openings blackish. Fins pale brownish.

Atlantic Ocean.

42105 U. S. N. M. Museum Hist. Nat. Paris 85 + 387.

Length 443 mm.

Halosauropsis ridgewayi new species

Depth 12 1/4 to 16, 5 2/3 to 6 3/5 to vent; head 6 9/10 to 7 in total, 3 to 3 1/8 to vent, width 3 1/5 to 3 1/2. Snout to eye 2 1/2 to 2 3/4 in head; orbit 4 1/4 to 4 1/3; eye 5 1/5 to 5 2/3, 1 7/8 to 2 in snout, greater than interorbital in young; maxillary reaches orbit, length from snout tip 2 3/4 to 2 7/8 in head; teeth in villiform bands in jaws and on palatines, on latter closely approximated or scarcely interrupted; bony interorbital 12 1/4 to 14, narrow, nearly level or depressed. Gill rakers 4 + 9, lanceolate, rather robust, 3/4 of gill filaments, which 1/2 of orbit.

Scales 40 to 50 in lateral line to vent, not enlarged; 12 above, 3 below, 33 to 35 predorsal forward to snout tip. Head scaly over all upper surface and postocular. Fins all more or less scaly basally. Scales with 12 to 16 long basal radiating striae; circuli moderate, not extended apically.

D. I, 9, I, first branched ray 1 4/5 to 1 9/10 in head, inserted at first fifth between ventral and anal origins; A. 140, longest front rays 2 2/3 to 2 4/5; tail long, slender, forming fine filament; pectoral 1 1/2 to 1 3/5; ventral 2 1/6 to 2 2/5.

Back and upper surfaces brown, little paler below, evidently silvery white in life. Head comparatively pale, under surface whitish. Iris gray. Inside mouth and gill opening blackish. Gray tints on opercle. Fins all pale brownish, paired ones little paler.

Diagnosis. Related to Halosaurus guntheri but with much larger scales, longer maxillary and lower surface of head and belly uniformly pale. Similar in physiognomy and scales well adherent.

Type. No. U. S. N. M.

For Robert Ridgeway, with pleasant memories of by gone days in his department in the old Smithsonian Institution.

1722. D. 5527. Balicasag Island (C.), N. 14° W., 8.2 miles (N. 9° 22' 30" E. 42' 40"), between Siquijor and Bohol. In 392 fathoms. August 11, 1909. Length 354 mm. Type.

2365. D. 5508. Camp Overton Light, Iligan Bay, S. 6° E., 4.9 miles (N. 8° 17' 24" E. 124° 11' 42"), northern Mindanao and vicinity. In 270 fathoms. August 4, 1909. Length 328 mm.

10139. D. 5511. Camp Overton Light, S. 80° E., 15.3 miles (N. 8° 15' 20" E. 123° 57'), northern Mindanao and vicinity. In 410 fathoms. August 7, 1909. Length 302 to 371 mm. 2 examples.

10270. D. 5513. Camp Overton Light, S. 67° E., 10.3 miles (N. 8° 16' 45" E. 124° 2' 48"), northern Mindanao and vicinity. In 505 fathoms. August 7, 1909. Length 354 mm.

10172. D. 5501. Macabalan Point Light (Mindanao), S. 35° E., 8.2 miles (N. 8° 37' E. 124° 35'), northern Mindanao and vicinity. In 214 fathoms. August 4, 1909. Length 328 mm.

D. 5504. Macabalan Point Light (Mindanao), S. 31° E., 7.7 miles (N. 8° 37' 15" E. 124° 36'), northern Mindanao and vicinity. In 220 fathoms. August 5, 1909. Length 172 mm.

3537. D. 5348. Point Tabonan, S. 89° E., 33.5 miles (N. 10° 57' 45" E. 118° 38' 15"), Palawan Passage. In 375 fathoms. December 27, 1908. Length 365 mm.

Genus Halosaurus Johnson

Halosaurus JOHNSON, Proc. Zool. Soc. London, 1863, p. 406. Type Halosaurus ovenii JOHNSON, monotypic.

Halosaurichthys ALCOCK, Ann. Mag. Nat. Hist., ser. 6, vol. 4, Nov. 1889, p. 454. Type Halosaurichthys carinicauda ALCOCK, monotypic.

Head without angular ridges. Snout obtusely rounded. Top of head scaly. Scales of lateral line scarcely enlarged. No second dorsal. Anal high. Ventrals normal.

Analysis of species

a[1]. Halosaurus. Orbit large, less than 7 1/4 in head.

b[1]. Maxillary not reaching orbit, or only to front edge of orbit.

c[1]. Lower gill rakers 9, scales 14 to 16 above lateral line.

d[1]. Anal 126; head 7 to 7 1/4, guntheri.

d[2]. Anal 188; head 7 4/5. oveni.

c[2]. Lower gill rakers 11 or 12; scales 9 to 14 above lateral line.

e[1]. Pectoral 1 3/5 to 2 in head; scales 30 to 45 to vent.

f[1]. Scales above lateral line 11; depth 14 4/5; head 6 1/6. radiatus.

f[2]. Scales above lateral line 12; depth 19 7/8 to 21 1/5; head 7 1/6 to 7 2/3. parvipennis.

f[3]. Scales above lateral line 14; depth 18 to 18 1/4; head 5 1/5 to 6 2/5. pallidus.

e[2]. Pectoral 2 1/5 to 2 4/5 in head; scales 52 to 59 to vent; head 7 1/5 to 8.

g[1]. Pectoral 2 1/5 in head; orbit 7 1/4; 12 scales above lateral line. attenuatus.

g^2. Pectoral 2 1.3 to 2 4/5 in head; orbit 5 3/4 to 6; 9 scales above lateral line. johnsonianus.

c^3. Lower gill rakers 17; 14 scales above lateral line; scales 55? to vent; head 6 1/5. pectoralis.

b^2. Maxillary reaches opposite pupil; 10 scales above lateral line; scales 30? to vent; head 7. nigerrimus.

a^2. Halosaurichthys. Oribit small, 10 in head; maxillary not to orbit; lower gill rakers 7 or 8; head 7 2/5. carinicauda.

Halosaurus guntheri Goode and Bean

Halosaurus guntheri GOODE and BEAN, Oceanic Ichth., 1895, p. 131. N. 39° 13' W. 70° 1', 594 fathoms.

-- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1896, p. 608 (copied).

Depth 12 3/4 to 19, 7 to 8 1/2 to vent; head 7 to 7 1/4 in total, 3 1/3 to 3 3/5 to vent, width 3. Snout to eye 2 2/5 in head; orbit 4 1/2 to 5; eye 5 1/2 to 7 3/5, 2 2/5 to 3 in snout, subequal with interorbital; maxillary reaches 4/5 to 9/10 to orbit, length from snout tip 2 3/5 to 2 3/4 in head; teeth in jaws villiform, also 2 palatine bands closely approximated; interorbital 5 1/2 to 7 3/5, low or but slightly convex. Gill rakers 3 + 9, rather robust, equal gill filaments or 2 1/3 in eye.

Scales 67 to 70 in lateral series to vent; 47 large scales in lateral line to vent; 14 or 15 above, 3 below, 40 to 48 predorsal to occiput. Entire top of head and postocular scaly. Fins all more or less scaly, especially basally. Scales with 9 to 11 basal radiating striae.

D. I, 9, I or I, 10, I, origin opposite first eighth in space between ventral and anal origins, first branched ray 1 4/5? to 2 in head; A. 126, third ray 3 to 3 1/2?; caudal 2; pectoral 1 2/3 to 2; ventral 2 1/4 to 2 3/5.

Brown generally, nearly uniform. Iris gray. Inside mouth and gill openings blackish. Fins brown, pectorals paler.

Western Atlantic.

38070 U. S. N. M. N. 39° 13' W. 70° 1', In 594 fathoms. Albatross Station 2722. Length 515 mm. Type.

35418 U. S. N. M. Albatross Station 2181. Length 487 to 518 mm. 2 examples.

47620 U. S. N. M. Blake Station LXVII. Length 325 mm. As Halosaurus oweni. (see G. or B. p. 131).

Halosaurus oveni Johnson

Halosaurus oveni JOHNSON, Proc. Zool. Soc. London, 1863, p. 406, pl. 36, fig. 2. Madeira.

Halosaurus owenii GUNTHER, Cat. Fishes Brit. Mus., vol. 7, 1868, p. 482 (type); Rep. Voy. Challenger, vol. 22, 1887, p. 236 (type). -- VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p. 175, pl. 14, fig. 5a-f, pl. 15, fig. 1 a-c, pl. 16, fig. 3-a (coasts of Morocco, Canaries, Soudan, Banc d' Arguin, Azores, 830 to 1617 meters).

Halosaurus oweni GOODE and BEAN, Oceanic Ichth., 1895, p. 150, pl. 40, fig. 152 (N. 39° 29' E. 71° 46', 693 fathoms; Blake Station LXVIII, 243 to 458 fathoms, off Guadeloupe and Santa Lucia). -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 607)compiled). -- GILCHRIST and VON BONDE, Fisher. Marine Biol. Survey South Africa, Rep. No. 3, 1922 (1924), No. 7, p. 10 (off Table Bay, 600 fathoms). -- BARNARD, Ann. South African Mus., vol. 21, pt. 1, June 1925, p. 166 (compiled).

Depth 13 1/5 to 18, 5 4/5 to 6 7/8 to anal; head 7 4/5 in total, 3 2/5 to anal, width 3 3/5. Snout to eye 2 1/3 in head; orbit 4 7/8 to 5; eye 7 to 7 4/5, 3 1/4 to 3 2/5 in snout, greater than interorbital; maxillary from snout tip reaches 4/5 or to orbit, length 2 1/8 to 3 in head; teeth in villiform bands in jaws, on palatines bands little narrower and closely approximated in front; interorbital 7 to 8, low, very slightly convex. Gill rakers 2 + 9, short points, equal gill filaments or 2 1/2 in eye.

Scales 60 in lateral line to vent, not especially enlarged; 16 above, 4 below. Snout, head above and postocular scaly. Fins scaly. Scales caducous, most all fallen.

D. I or II, 8, I to 10, I, first branched ray 2 to 2 1/8 in head, origin at first eighth between ventral and anal origins; A. 188, longest front ray 2 3/4 in head; tail tapers into long slender filament; pectoral 1 2/3 to 2; ventral 2 1/2 to 3.

Nearly uniform brownish. Under surface of head usually pale. Iris grayish. Inside mouth and gill opening blackish. Lower sides of head whitish. Fins uniform pale brown.

Atlantic Ocean.

33379 U. S. N. M. Albatross Station 2072. Length 110 to 383 mm., smaller with tail broken off.

35418 U. S. N. M. Albatross Station 2181. 1884. Length 543 mm.

Halosaurus radiatus Garman

Halosaurus radiatus GARMAN, Mem. Mus. Comp. Zool., vol. 24, 1899, p. 298, pl. 60, fig. 2, pl. 84, figs. 3-6.

N. 7° W. 78° to 80°, 259 to 511 fathoms, Panama Gulf.

Depth 14 4/5, 6 1/2 to vent; head 6 1/6 in total, 2 7/8 to vent, width 3 1/2. Snout 3 in head; eye 6 3/4, 2 1/6 in s snout, nearly subequal with interorbital; maxillary reaches nearly to eye, length from snout tip 3 in head; teeth minute, villiform, in narrow bands in jaws, on palatines and pterygoides; interorbital 5 1/8, low, depressed. Gill rakers 5 + 11, 3/4 of gill rakers, which 1 1/2 in eye.

Scales 175? in median lateral series to caudal base; 45 scales in lateral line to vent; 11 above, 4 below. Top of head and postocular finely scaly. Fins more or less scaly. Scales very caducous, most all fallen.

D. I, 9, I, first branched ray 2 in head, origin at first sixth in space between ventral and anal origins; third anal ray 2 3/5 in head; tail tapers to very slender filament, caudal 4; pectoral 2; ventral 2 4/5.

Brown, sides and under surfaces paler, likely silvery white when fresh. Iris grayish. Inside mouth and gill opening black. Fins rather pale brownish.

Eastern Pacific. Garman gives the increased branchiostegal rays, 21 to 23, as a character of distinction.

57890 U. S. N. M. Albatross Station 3354. Length 240 mm.

Halosaurus parvipennis Alcock

Halosaurus parvipennis ALCOCK, Ann. Mag. Nat. Hist., ser. 6, vol. 10, 1892, p. 362. Laccadive Sea, 865 to 880 fathoms; Journ. Asiatic Soc. Bengal, vol. 65, pt. 2, 1896, p. 336 (reference); Cat. Deep Sea Fishes Indian Mus., 1899, p. 186 (Arabian Sea, off Malabar coast, 459 to 880 fathoms).

Halosaurus parvipinnis ALCOCK, Illustrat. Zool. Investigator, Fishes, pt. 7, 1900, pl. 33, fig. 1.

Depth 19 7/8 to 21 1/5, 7 1/8 to 7 3/5 to vent; head 7 1/6 to 7 2/3 in total, 2 3/4 to vent, width 2 3/4 to 3 2/5. Snout to eye 2 1/4 in head; orbit 5 to 6 1/4; eye 7 1/3 to 8 1/4, 3 1/4 to 3 2/5 in snout, 1 to 1 2/5 in interorbital; maxillary reaches orbit, length from snout tip 2 2/5 in head; villiform teeth in bands in each jaw, rather short closely approximated band on each palatine; interorbital 6 2/5 to 8 1/4, low, depressed. Gill rakers 3 + 11 or 12, rather robust, lanceolate, 1 1/2 in orbit; gill filaments 3/4 gill rakers.

Scales 30? enlarged to vent; 42 to 44 scales close along above lateral line to vent; 12 above to dorsal origin, 2 below, 33 to 38 predorsal forward to occiput. Top of head naked, postocular scaly. Fins scaly basally. Scales very caducous, most all fallen. Scales with 7 or 8 long basal radiating striae; circuli extend well apically, though not to edge of scale.

D. I to II, 9, I, first branched ray 2 1/8 to 2 2/5 in head, fin origin about first eighth to tenth between ventral and anal origins; front anal height 3 to 3 2/3 in head; caudal extended in filament; pectoral 1 3/5 to 1 7/8; ventral 2 2/3 to 3 1/10.

Brown. Head neutral gray to slate, snout pale brownish. Iris dark gray. Inside mouth and gill opening blackish. Iridescent luster on opercle. Fins all pale brown.

Indian and Pacific Oceans.

2928. D. 5470. Atulayan Island (E.), S. 68° W., 6.7 miles (N. 13° 37' 30" E. 123° 41' 9"), east coast of Luzon. In 560 fathoms. June 18, 1909. Length 274? mm., tail broken.

10216. D. 5697. Binang Unang Island (E.), S. 36° E., 5 miles (S. 0° 4' E. 121° 36'), Gulf of Tomini, Celebes. In 761 fathoms. November 18, 1909. Length 420 mm.

4232. D. 5655. Cape Tabako, N. 7° E., 13 miles (S. 3° 34' 10" E. 120° 50' 30"), Gulf of Boni. In 608 fathoms. December 18, 1909. Length 253 mm.

3495. D. 5647. North Island (S.), S. 87° E., 11.6 miles (S. 5° 34' E. 122° 18' 15"), Buton Strait. In 519 fathoms. December 16, 1909. Length 378 mm.

2121. D. 5460. Sialat Point Light, N. 24° E., 8.2 miles (N. 13° 32' 30" E. 123° 58' 06"), east coast of Luzon. In 565 fathoms. June 10, 1909. Length 277? mm., tail broken.

10286. D. 5582. Si Amil Island (N.), S. 82° W., 6.2 miles (N.4° 19' 54" E. 118° 58' 38"), vicinity of Darvel Bay, Borneo. In 890 fathoms. September 26, 1909. Length 266 mm.

Halosaurus pallidua (Goode and Bean)

Aldrovandia pallida GOODE and BEAN, Oceanic Ichth., 1895, p. 135, pl. 42, fig. 158. N. 24° 36' W. 84° 5', 955 fathoms; N. 28° to 41° W. 65° to 87°, 679 to 1430 fathoms. -- JORDAN and EVERMANN, Bull. U. S. Nat. Mus., No. 47, pt. 1, 1896, p. 611 (copied).

Depth 18 to 18 1/4, 7 to 8 1/2 to vent; head 5 1/5 to 6 2/5 in total, 3 to 3 1/8 to vent, width 3 to 4 1/2. Snout 2 to 2 2/5 in head, preoral portion 1 3/4 to 2 1/4 in snout length to eye; orbit 4 3/5 to 7 1/4 in head; eye 7 1/4 to 9 1/5, 3 2/3 to 4 in snout, 1 1/4 to 1 3/4 in interorbital; maxillary reaches 7/8 to eye, length from snout tip 2 to 2 1/4 in head; teeth in broad villiform bands in jaws, narrower closely approximated bands on palatines; interorbital 6 to 6 1/5, low depressed. Gill rakers 2 or 3 + 12, lanceolate, 1 4/5 in eye; gill filaments 2/3 gill rakers.

Scales 56 in lateral line to vent; 30 enlarged scales in lateral line to anal, followed by others to middle of tail; 14 above, 3 below, 36 predorsal to occiput. Top of head naked, postocular scaly. Dorsal and anal scaly. Scales caducous, most all fallen.

D. I, 9, I, first branched ray 2 to 2 1/2? in head, origin close behind ventral origin or over ventral base; A. with second ray 3 2/3 to 4 1/8?; tail ends in slender filament; pectoral 1 4/5 to 1 7/8; ventral 2 3/4 to 3 1/3?

Pale brown. Head neutral gray to slaty, blackish underneath. Iris gray. Inside mouth and gill opening black.

Atlantic Ocean.

35638 U. S. N. M. Length 492 mm.

38140 U. S. N. M. N. 24° W. 74°, Albatross Station . Length 230? mm. to end of broken tail.

44832 U. S. N. M. Albatross Station. Length 167 mm.

Halosaurus attenuatus Garman

Halosaurus attenuatus GARMAN, Mem. Mus. Comp. Zool., vol. 24, 1899, p. 296, pl. 60, figs. 1-a. N. 2° 34' W. 92° 06', 1360 fathoms, north of Culpepper Islands.

-- TOWNSEND and NICHOLS, Bull. Amer. Mus. Nat. Hist., New York, vol. 52, art. 1, May 16, 1925, p. 11 (off Port San Juanico, Lower California, Lat. 26°, 645 fathoms).

Depth 16, 6 1/4 to vent; head 8 in total, 3 to vent, width 2 4/5. Snout 2 1/3 in head; eye 7 1/4, 3 1/8 in snout, more than twice interorbital; maxillary reaches 7/8 to eye, length from snout tip 2 1/3 in head; teeth small, in villiform bands, in jaws, on palatines and pterygoids; interorbital 16, low, depressed. Gill rakers 11, tubercular, shorter than gill filaments.

Scales 59 in lateral line till opposite vent; 12 above, 5 below.

D. I, 9, second branched ray 3 in head, origin at first fourth between ventral and anal origins; second anal ray 4 3/4 in head; tail tapers in long slender filament; pectoral 2 1/5, rays 15; ventral 2 4/5 in head.

Gill membranes, throat, intestines and linings of body cavity black. Sides of head blackish, except mucous canals and luminous organs. Muscular portion of body light reddish brown. Length 410 mm. (Garman.)

Eastern Pacific Ocean.

Halosaurus johnsonianus Vaillant

Halosaurus johnsonianus VAILLANT, Exped. Sci. Travailleru et Talisman, Poiss., 1888, p. 181, pl. 15, fig. 2.

Off Morocco, Canaries, Soudan coast, Banc d' Arguin, 834 to 2115 meters. -- GOODE and BEAN, Oceanic Ichth., 1895, p. 131, pl. 40, fig. 153 (compiled). -- VAILLANT, Res. Camp. Sci. Monaco, vol. 52, 1919, p. 130 (N. 37° 42' 40" W. 25° 5' 15", 1385 meters).

Depth 25 to 28, 9 1/5 to 11 to anal; head 7 1/5 to 8 in total, 2 7/8 to 3 1/5 to anal, width 4 1/5 to 4 2/5. Snout 2 1/3 to 2 1/2 in head; eye 5 3/4 to 6, 2 1/4 to 2 2/3 in snout, greater than interorbital; maxillary reaches 7/8 or to eye, length from snout tip 2 1/3 in head; teeth in jaws rather coarse, sharp pointed, palatine bands separated; interorbital 9 1/4 to 10, low, slightly depressed medially. Gill rakers 4 + 11, lanceolate, rather robust, 1 3/4 in eye, twice gill filaments.

Scales 52 in lateral line to anal origin; 9 above, 3 below. Top of head, postocular and opercle scaly. Scales very caducous, most all fallen.

D. I, 9, I, first branched ray 2 1/8 in head, fin origin slightly behind first fourth between ventral and anal origins; first anal ray 3 1/5 to 3 3/5 in head; tail tapers in long slender point; pectoral 2 1/3 to 2 4/5; ventral 2 1/2 to 2 4/5.

Body brown. Inside mouth and gill openings, also most of lower surface of head blackish. Iris gray. Fins uniformly pale.

Atlantic Ocean.

42094 U. S. N. M. Museum Hist. Nat. Paris 85 - 374.
Length 270 mm.
42109 U. S. N. M. Museum Hist. Nat. Paris 85 - 364.
Length 375 mm.

Halosaurus pectoralis Mc Culloch

Halosaurus pectoralis MC CULLOCH, Biol. Res. Endeavour, vol. 5, pt. 4, June 8, 1926, p. 171, pl. 43, fig. 3. Great Australia Bight, south from Eucla, 350 to 450 meters.

Depth 17, 7 3/4 to vent; head 6 1/5 in total 2 4/5 to vent. Snout 2 1/5 in head; eye 6 1/2, 3 in snout; maxillary not quite reaching eye, length from snout tip 2 1/8 in head; teeth in villiform bands in jaws, on palate and tongue; interorbital low, flat. Gill rakers + 17, 1/3 of eye.

Scales about 55? in lateral line to vent; 14 above.

D. I, 9 to 12, first branched ray 2 1/4 in head, fin origin close behind ventral origin or little behind forst seventh between ventral and anal origins; A. 158, third ray 3 1/4; caudal 1 1/2; pectoral 1 2/5; ventral 2 3/5.

Whitish after long preservation. Scale pits margined brown on upper parts. Eye and gill covers black. Hind third of anal and caudal with brown edges. Length 545 mm.

(Mc Culloch).

Australian Seas.

Halosaurus nigerrimus (Alcock)

Halosaurichthys nigerrimus ALCOCK, Ann. Mag. Nat. Hist., ser. 7, vol. 2, 1898, p. 149. Off Maldives, 459 fathoms; Illustrat. Zool. Investigator, Fishes, pt. 7, 1900, pl. 33, fig. 2.

Halosaurus nigerrimus ALCOCK, Cat. Deep Sea Fishes Indian Mus., 1899, p. 188 (type).

Depth 13 3/4, 5 4/5 to anal; head 7 in total, 3 to anal. Snout 2 1/4 in head; eye 6 1/4, 2 4/5 in snout, greater than interorbital; maxillary reaches pupil, length 2 in head; interorbital 1 1/2 in eye, rather low. Numerous long close set gill rakers on outer side of first arch.

Scales 30? in lateral line to vent; 10 above, 2 below. Temples and cheeks scaly. Low median fold with some enlarged scales behind dorsal fin. Scales deciduous.

D. 12, first branched ray 1 3/4 in head, fin origin first seventh of space between ventral and anal origins; first anal ray 4 1/3; tail ends in long slender point; pectoral 2 1/10, rays 9; ventral 2 1/3 in head, rays 8.

Uniform jet black. Length 191 mm. (Alcock.)

Indian Ocean. Branchiostegals 12.

Halosaurus carinicauda (Alcock)

Halosaurichthys carinicauda ALCOCK, Ann. Mag. Nat. Hist., ser. 6, vol. 4, Nov. 1889, p. 454. Andaman Sea 7 1/2 miles east of North Cinque Island, 490 fathoms; Illustrat. Zool. Investigator, Fishes, pt. 1, 1892, pl. 7, figs. 2-a. -- GOODE and BEAN, Oceanic Ichth., 1895, p. 136 (reference).

Halosaurus carinicauda ALCOCK, Journ. Asiatic Soc. Bengal, vol. 65, pt. 2, 1896, p. 336 (Andaman Sea, 490 fathoms).

Halosauris carinicauda ALCOCK, Cat. Deep Sea Fishes Indian Mus., 1899, p. 187 (type; error).

Depth 13 3/4, 6 1/2 to vent; head 7 2/5 in total, 3 1/2 to vent. Snout 2 3/4 in head; eye 10, 3 2/3 in snout, less than twice in interorbital; maxillary not quite reaches eye, length 2 2/3 in head; pterygoid band of teeth narrow, scarcely separated from palatine band; interorbital low. Gill rakers + 7 or 8, also some smaller ones.

Scales 60 in lateral line to vent; 14 above, 2 below, to anal origin. Head and snout scaly. Some scales medianly behind dorsal enlarged and slightly elongated, in posterior part of tail set in low median fold of skin.

D. 11, first ray 2 in head, fin origin near first seventh between ventral and anal origins; first anal ray 6 3/4 in head; tail tapers to long slender filament; pectoral 1 3/5, rays 14 or 15; ventral 2 1/4 in head, rays 10.

Sepia brown, greater part of head blackish. Length 395 mm. (Alcock)

Andaman Sea. Alcock's figure shows an adipose fin, not mentioned in hes description, about first 2/11 of tail, its length 2 3/5 in snout. He says the species differs from Halosaurus parvipennis chiefly in having the ventral fins united with one another. Branchiostegals 12 to 13.